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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Influence of initial soil moisture in a Regional Climate Model study over West Africa. Part 2: Impact on the climate extremes" *by* Brahima Koné et al.

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Major/Specific Comments: 1. Comments from reviewer 2: Model evaluation: The authors need to either demonstrate that the model used can reproduce precipitation or temperature extremes in the study region or provide a citation demonstrating this otherwise this model may not be a good tool for this research question. It's important that the evaluation be of precipitation extremes rather than the means or seasonal cycle (as in Koné et al. 2018) since that is what the authors are focusing on. Author's response: Thank you for your comment. The RegCM model is one of the most widely used models by the scientific community to reproduce mean and extreme climate al-

most anywhere in the world. In this study we evaluated its performance in West Africa for extreme climate. The model performs well in West Africa as well as in Asia in the representation of mean and extreme climate. The choice of a complex land surface model CLM4.5 coupled with RegCM4 need to be evaluated since it is not done before in climate extreme study over Africa. As compared with a previous study done by over Asia, RegCM4 reproduce well thee precipitation and temperature extremes over Africa.

Minor/Technical Comments:

1. Comments from reviewer 2: Minor points: Statistical signiïňĄcance: Perhaps I misunderstood the methods, but it seems like statistical signiïňĄcance can't be evaluated using this model setup (which is okay) but it shouldn't be presented as if it can. Each point only has a control year and two models run right? Please explain this further, the methods section does not provide enough detail here. What is your null distribution and what is your test distribution at each point? Author's response: Thank you for your comment. Our null hypothesis is the sample means are from the same population (i.e. H0: ave1=ave2). We used the student-t distribution. Rejection of the null hypothesis (i.e. acceptance of the alternative hypothesis) indicates that the sample means are from two different populations. Author's changes in manuscript: We did this following modification in the manuscript at Section 2.2 line 140 to146: we perform the two-tailed of the student's t-distribution at every grid points as did by Liu et al. (2014) in a similar work over Asia.

2. Comments from reviewer 2: PDF ïňĄgures: In my opinion the PDFs don't add information and should probably be removed from both manuscripts to save space. The PDFs duplicate the spatial maps of changes, which provide more information, and double the number of ïňĄgures presented. Author's response: Thank you for your comment. The use of PDFs is important because it gives important information such as how many grid are impacted, their highest value of biases and the quantification of the impact of the soil moisture initial conditions on the contrast between the years .The mean biases can't give such information.

3. Comments from reviewer 2: Pattern correlations in Table 3: It's not clear exactly how to interpret the pattern correlations for temperature. A value of 0.99 for every single value seems to imply that either there's an error in the calculation or that the metric is not useful. Are the temperature datasets this closely aligned, and if so would it be more useful to assess pattern correlation of temperature anomalies rather than the absolute temperature Author's response: Thank you for your comment. The pattern correlation coefficient is most of statistical tools used in modeling to assess the large scale correlation between two different product. This high value of the coefficient PCC is not new, many study with RegCM4 reveal its good large-scale representation of the temperature variable more than 0.9 (Diallo and al. 2013; Diallo and al 2016, Koné and al. 2018).

4. Comments from reviewer 2: I assume that the labels for TRMM should be EIN here as well. Author's response: Thank you for you. We don't know at which line this confusion is done but we improved the quality of the figures in this revised version. Please confim in which Figure or line the confusion has been done.

References:

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Diallo I., Giorgi F., Deme A, Tall M., Mariotti L., Gaye A., Projected changes of summer monsoon extremes and hydroclimatic regimes over West Africa for the twentyâĂŚfirst century. Clim Dyn DOI 10.1007/s00382-016-3052-4, (2016).

Koné B., Diedhiou A., N'datchoh E. T., Sylla M. B. , Giorgi F., Anquetin S., Bamba A., Diawara A., and Kobea A. T.: Sensitivity study of the regional climate model RegCM4 to different convective schemes over West Africa. Earth Syst. Dynam., 9, 1261–1278. https://doi.org/10.5194/esd-9-1261-2018, 2018.

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